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Transformation of Early Childhood Education: A Descriptive Quantitative Analysis of Critical Thinking Skill Development in Banten Province, Indonesia

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Abstract
This study explores the perceptions of PAUD teachers in Lebak, Banten, about critical thinking skills in learning for children aged 4-6 years, learning strategies, and challenges faced. A descriptive quantitative approach was used with an open-ended questionnaire filled out by 131 teachers. Data were analyzed using descriptive statistics with presentation in the form of visual graphs. The results showed that teachers' understanding of critical thinking indicators varied, with 39.6% understanding critical thinking more as the ability to analyze, 14.4% as interpretation, 12.6% as evaluation, 8.2% as inference, 5.4% as explanation, and 4.5% as self-regulation. Teachers emphasized analysis and interpretation through interactive methods, while evaluation and inference were less applied. The novelty of this study lies in the mapping of teachers' understanding based on critical thinking indicators and their impact on learning strategies. Recommendations for training based on direct practice and reflection to improve the implementation of critical thinking evenly are contributions to the research results as well as being the basis for improving policies and developing teacher training in areas with low HDI.

Keywords: *critical thinking; child development; early childhood education; educational strategies; teacher challenges*

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Introduction

Critical thinking is an essential competency for addressing global challenges and rapid technological advancements (Wolff, Skarstein, & Skarstein, 2020; Wulandari, Amin, Zubaidah, & IAM, 2017; ŽivkoviĽ, 2016). Education plays a strategic role in fostering this skill as a primary objective (Oner & Aggul, 2020). Critical thinking not only predicts academic success (Han & Brown, 2013) but also facilitates effective problem-solving (Saputra, Joyoatmojo, Wardani, & Sangka, 2019; Wahidin & Romli, 2020) and the development of life skills (Syawaludin, Gunarhadi, & Rintayati, 2019). Given its significance, understanding how critical thinking develops, particularly in early childhood education, is crucial for effective implementation.

Scholars have conceptualized critical thinking in various ways throughout history. Dewey (1910) viewed critical thinking as an active process, emphasizing that thinking involves

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individuals asking their own questions, seeking relevant information independently, and reflecting on their thoughts. Ennis (1989) expanded on this by defining critical thinking as reflective thinking that is reasonable and focused on deciding what to believe or do, with an emphasis on evaluating the accuracy of statements. Similarly, Facione (2015) defines critical thinking as purposeful thinking aimed at determining what to believe, accept as true, or do, by utilizing methods, standards, evidence, and the context within which they are applied. Paul & Elder (2006) describe critical thinking as the art of analyzing and evaluating thinking to enhance its quality. Fisher and Scriven (2013) further emphasize that critical thinking involves a skilled and active interpretation and evaluation of observations, information, and arguments after thorough consideration of the available evidence. These perspectives highlight that critical thinking is not only about cognitive processing but also about reasoning, evaluation, and decision-making..

Developing critical thinking skills from an early age is an effective strategy for maximizing children's cognitive potential (Leon, 2015). The period from 0 to 8 years is a crucial phase for cognitive and emotional development, during which children exhibit a high level of curiosity and the potential to develop critical thinking skills through interactions with their environment (Pollarolo, 2022). In this context, early childhood educators play a pivotal role in creating a learning environment that stimulates critical thinkin(Anazifa & Djukri, 2017; Liu, Frankel, & Roohr, 2014). Therefore, teachers must adopt 21st-century learning approaches that emphasize critical thinking, creativity, innovation, communication, and collaboration (Saleh, 2019; ŽivkoviĿ, 2016). This shift in pedagogy requires educators to implement interactive and inquiry-based learning experiences that encourage children to ask questions, explore solutions, and evaluate outcomes.

Although critical thinking skills are important, their implementation in early childhood education still faces various challenges, especially in areas with socio-economic limitations. Educational theory emphasizes the importance of interactive and problem-based learning methods in developing critical thinking skills. However, in practice, teachers often face obstacles in implementing these strategies effectively due to limited resources, lack of training, and social environmental factors that do not always support active learning. Several studies have shown that various methods can improve critical thinking skills. For example, research by Sope & Murtono (2024) and Wahyuseptiana, Aje, & Widjanarko (2022) found that the STEAM method can improve critical thinking skills in early childhood. Additionally, design-based STEM activities have been shown to contribute to the development of critical thinking in preschoolers aged 60–72 months (Uyulan & Aslan, 2024). Inquiry-based learning has also proven effective in fostering critical thinking skills in early childhood (Priyanti & Warmansyah, 2021). However, other studies indicate that there are still gaps in the application of innovative methods and the integration of new technologies in teaching critical thinking (Alsaleh, 2020). This highlights that while various methods have been proven effective, their implementation still faces challenges, particularly regarding teacher readiness and the availability of resources.

The challenges in developing critical thinking skills are also seen in Lebak Regency, Banten Province, which has the lowest Human Development Index (HDI) among the eight regencies and cities in Banten, which is 65.21 (Statistik, 2024). The HDI, which reflects the quality of education, health, and income, has an impact on the effectiveness of learning, including in developing critical thinking skills in early childhood. Especially in Lebak Regency, socio-economic factors are a significant obstacle in implementing learning strategies that stimulate critical thinking.

In response to these challenges, an observation was conducted at PGRI 1 Kindergarten in Gunung Kencana District to examine how critical thinking is fostered in practice. The learning theme "I Love Indonesia" uses an exploratory approach by introducing Jojorong (traditional food), Baduy clothing, and the Oray-orayan game. The teaching strategies implemented include question and answer sessions, the use of real objects, and practical tasks

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such as making Jojorong and sticking dry leaves on paper. Children are also asked to retell the activities they have done. This approach is designed to actively engage children and stimulate their reflective thinking.

The evaluation results based on six critical thinking indicators by Facione, (1990) showed that the ability to interpret, analyze, and evaluate was categorized as "beginning to develop" (81%) and "developing as expected" (19%). Meanwhile, the skills of concluding, explaining, and self-regulating were evenly distributed, with 50% of children in the "beginning to develop" category and 50% in the "developing as expected" category. Further analysis showed that the main challenges in concluding, explaining, and self-regulating came from limitations in reflective learning, where children still needed more practice in connecting concepts, explaining reasoning, and organizing their own thoughts.

These data indicate that the teaching approach applied has supported the development of children's critical thinking, although challenges remain in the areas of concluding, explaining, and self-regulating. Therefore, more systematic and evidence-based learning innovations are needed to optimize the development of critical thinking skills from an early age. These findings highlight the importance of improving the quality of education, especially in fostering children's critical thinking skills. Teachers' perceptions of critical thinking significantly influence their teaching approaches and skill development in the classroom (Choy & Cheah, 2009). Thus, teachers' understanding is a key factor in teaching effectiveness.

The novelty of this study lies in its focus on early childhood educators' understandings and practices in developing critical thinking skills in a socioeconomically challenged area, such as Lebak Regency. This study fills a gap in the literature by providing empirical insights into how socioeconomic conditions influence critical thinking instructional strategies—a topic that remains underexplored. By examining the relationship between socioeconomic factors and the effectiveness of critical thinking instruction, this study contributes to broader academic discussions on early childhood education.

Practically, the results of this study can serve as a basis for developing more specific and evidence-based training programs to improve teachers' skills in implementing teaching strategies that stimulate critical thinking. In addition, these findings offer recommendations for policymakers to provide more effective resources and support for teachers in socioeconomically challenged areas. In the long run, improving teachers' competence in teaching critical thinking can contribute to improving the overall quality of education.

Thus, this study not only contributes to the academic literature but also has real implications for improving the quality of education and teacher professionalism in disadvantaged areas. Continued efforts in teacher training and critical thinking-based curriculum development are essential to ensure that every child has an equal opportunity to maximize their cognitive potential.

Methodology

This study used a quantitative descriptive approach to explore kindergarten teachers' perceptions of critical thinking, the strategies they employ in teaching, and the challenges they face in fostering critical thinking skills in children aged 4–6 years. This approach was chosen because it allowed for a structured analysis of response patterns from a large number of teachers, providing a clearer overview of general trends in early childhood education practices. The focus on children aged 4–6 years was based on their cognitive development, which begins to demonstrate more complex thinking skills. At age 4, children begin to experiment with cause-and-effect relationships and demonstrate basic reasoning in problem solving—fundamental aspects of critical thinking (Lightfoot, Cole, & Cole, 2018). At age 5–6, children show improvements in logical reasoning, increased curiosity, and the ability to construct simple arguments and compare information (Piaget, 1952). Given these cognitive developments, this age group was chosen as the primary focus for understanding how critical thinking skills are introduced and developed in early childhood education settings.

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Participants in this study were 131 kindergarten teachers in Lebak Regency, Banten, who were purposively selected based on their involvement in teaching children aged 4-6 years. Lebak Regency was chosen because of its unique challenges in implementing critical thinking-based learning strategies, especially in areas with limited educational resources. Data were collected using a questionnaire with three open-ended questions, focusing on teachers' understanding of critical thinking, the teaching strategies they use, and the challenges they face in implementing them. The questionnaire was distributed in printed format directly to teachers at SKB Sajira (Sajira District) and TK Negeri Gunung Kencana (Gunung Kencana District).

The collected data were analyzed using descriptive statistical techniques, which involved categorizing responses, calculating frequency distributions, and visualizing data in graphical formats. The analysis followed the following steps: 1). Data Categorization – Responses were grouped into major themes based on recurring patterns in teachers' answers; dan 2). Response Quantification – The frequency of each theme was calculated to identify dominant perceptions, strategies, and challenges; 3). Graphical Representation – The results were visualized using bar charts and pie charts to illustrate the trends and distribution of responses; and, 4). Interpretation of Findings – The graphical data were analyzed to highlight key insights related to teachers' understanding and practices of critical thinking in early childhood education.

This study focused on summarizing and presenting collective patterns in teachers' responses quantitatively. Since this study used open-ended questions without psychometric testing, no formal validity and reliability tests were conducted. However, the credibility of the data was maintained through systematic documentation, transparent coding procedures, and expert review of the categorization of responses.

Result And Discussion

Understanding of Early Childhood Education Teachers Regarding Critical Thinking

Based on the survey results, the information indicates that early childhood education teachers perceive critical thinking as:
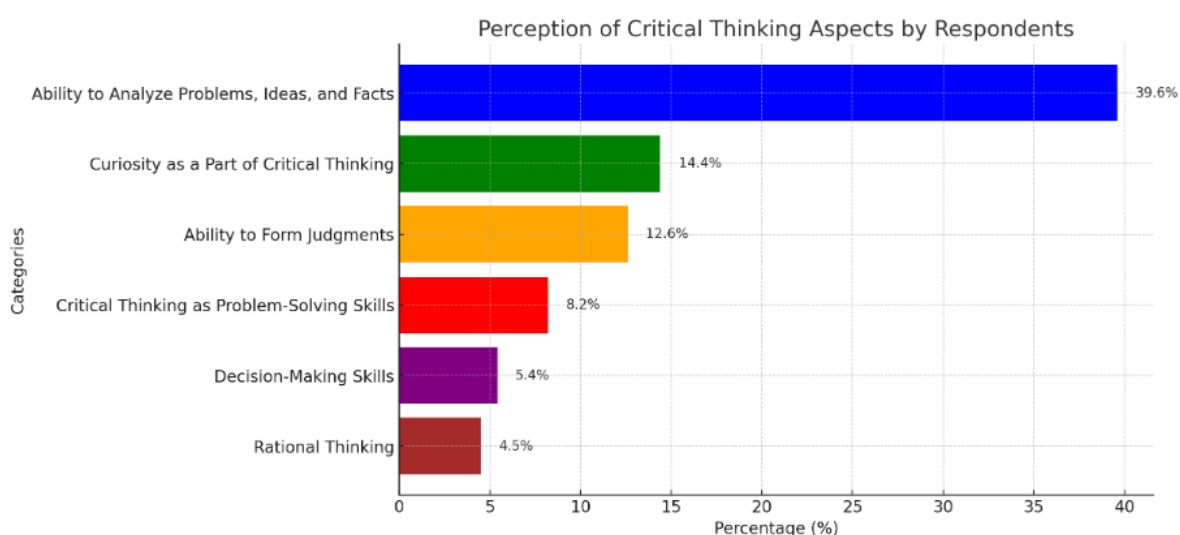
Figure 1. Perception of Critical Aspects by Respondents

Based on survey data, the majority of respondents (39.6%) understand critical thinking as the ability to analyze problems, ideas, and facts. This indicates that analysis is considered the primary aspect of critical thinking. In line with Ennis (2015), this ability allows individuals to break down information, compare key elements, and evaluate relationships between ideas and facts. Facione (1990) also emphasizes that analysis includes the skills to

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identify assumptions and assess evidence systematically, which is crucial in data-driven decision-making.

In addition to analysis, curiosity is also seen as part of critical thinking by 14.4% of respondents. This suggests that critical thinking not only involves evaluating information but also a drive to explore deeper. According to Paul & Elder (2013), curiosity is the foundation of critical thinking as it encourages individuals to ask questions, investigate, and challenge existing assumptions. Lipman (2003) also asserts that deep thinking often begins with intellectual curiosity.

A total of 12.6% of respondents associate critical thinking with the ability to form judgments. This means they view critical thinking as a process of objectively evaluating information to make appropriate decisions. Facione (1990) states that in the critical thinking process, individuals must be able to assess claims and arguments based on rational criteria. Halpern (2013) also emphasizes that this skill is crucial, especially when individuals are faced with multiple perspectives that must be considered before making a decision.

Critical thinking is also frequently linked to problem-solving, as indicated by 8.2% of respondents. This reflects that critical thinking helps individuals analyze problems, identify alternative solutions, and choose the best course of action. Paul and Elder (2013) explain that problem-solving is a natural outcome of critical thinking. Meanwhile, Halpern (2013) asserts that critical thinkers weigh various options and make the most rational decision based on a deep understanding of the situation at hand.

Additionally, decision-making and rational thinking were identified by 5.4% and 4.5% of respondents, respectively, as essential aspects of critical thinking. Decision-making skills involve analyzing situations, considering consequences, and selecting the best solution, while rational thinking ensures that decisions are based on logic and evidence rather than emotions or assumptions. Ennis (2015) emphasizes that rational thinking is at the core of critical thinking because it involves a systematic and logical thought process. Facione (2015) also states that critical thinkers must be able to use information rationally to make decisions that best suit the circumstances.

Strategies for Developing Critical Thinking Skills in Early Childhood

The teacher's experience in stimulating critical thinking can be seen through various strategies employed. Paul and Elder (2020) state that if an educator teaches children how to think critically, they must explicitly understand what they are teaching and explain it to the learners. Survey results regarding the strategies used by teachers are presented based on the following themes.
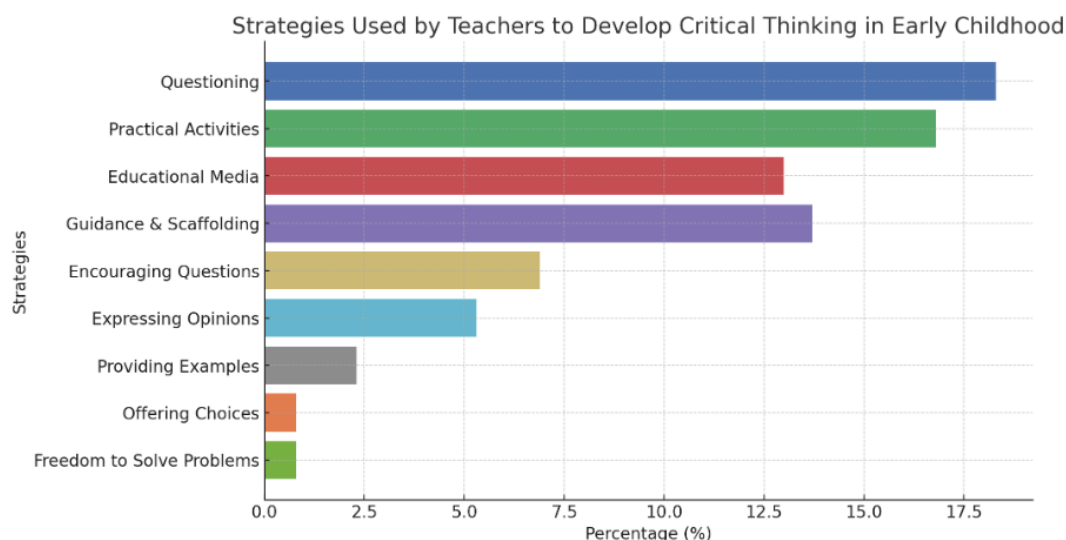
Figure 2. Strategi Used by Teachers to Develop Critical Thinking in Early Childhood

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Based on the data in the bar chart, the most widely used strategies by teachers to develop critical thinking in early childhood are questioning and practical activities. This approach highlights the effectiveness of interactive methods, such as question and answer and problem-solving tasks in fostering higher-order thinking skills (Facione, 2011). This strategy shows that teachers rely more on questioning techniques to stimulate children's critical thinking, which is in accordance with previous research that open-ended questions can help children develop analytical and reflective skills (Paul & Elder, 2013). Carefully crafted questions can encourage children to think more deeply, while hands-on activities allow them to apply their understanding in real-world scenarios. Furthermore, strategies that are also widely used are educational media and guidance & scaffolding. Visual aids such as pictures, videos, and concrete props serve as effective tools in facilitating learning, while structured guidance helps children better understand concepts and stay engaged. This approach is in line with Vygotsky (1978) Zone of Proximal Development (ZPD), which emphasizes the role of adult support in cognitive development. Teacher responses indicate that explorative and inspirational media strategies are often used to enrich children's critical thinking experiences. This is in line with Piaget (1999) statement that children in the preoperational stage need active stimulation to develop their cognitive abilities.

The encouraging questions strategy has a fairly significant percentage compared to several other strategies, but is still lower than questioning (asking by the teacher). This shows that teachers ask children questions more often than encouraging children to actively ask questions themselves. In fact, encouraging children to ask questions is an important strategy in developing critical thinking because it allows children to explore ideas, clarify understanding, and develop greater curiosity (Chouinard, 2007). According to Vygotsky (1978), social interaction plays an important role in children's cognitive development, and when children are encouraged to ask questions, they are more actively involved in the learning process. In addition, Paul & Elder (2013) also emphasize that children who are accustomed to asking questions will be better able to think analytically and reflectively, which are important elements in critical thinking.

Furthermore, the expressing opinions strategy has a lower percentage compared to the main strategies such as questioning and practical activities, but is still used by teachers in developing critical thinking in early childhood. Encouraging children to express their opinions helps them in constructing arguments, analyzing information, and evaluating the ideas they have. Critical thinking skills develop when individuals are able to express their ideas and defend opinions based on logical reasons.

The providing examples strategy has a lower percentage compared to the main strategies such as questioning or practical activities, but is still part of the approach used by teachers. Providing examples helps children understand abstract concepts more concretely and allows them to connect new information with experiences they already have (Rosenshine, 2012). Examples given by teachers can also guide children in critical thinking by showing how to analyze and evaluate situations before making their own decisions.

Meanwhile, strategies such as offering choices and freedom to solve problems have a lower percentage. This shows that the approach that provides freedom of thought and decision-making is still not a top priority in teaching in PAUD. In fact, constructivist educational theory emphasizes that children learn more effectively when they are given the opportunity to explore and find their own solutions.

Challenges in Stimulating Critical Thinking Skills

Survey results indicate that challenges in stimulating critical thinking skills come from both teachers and students. The challenges faced by early childhood educators in Lebak are outlined below.

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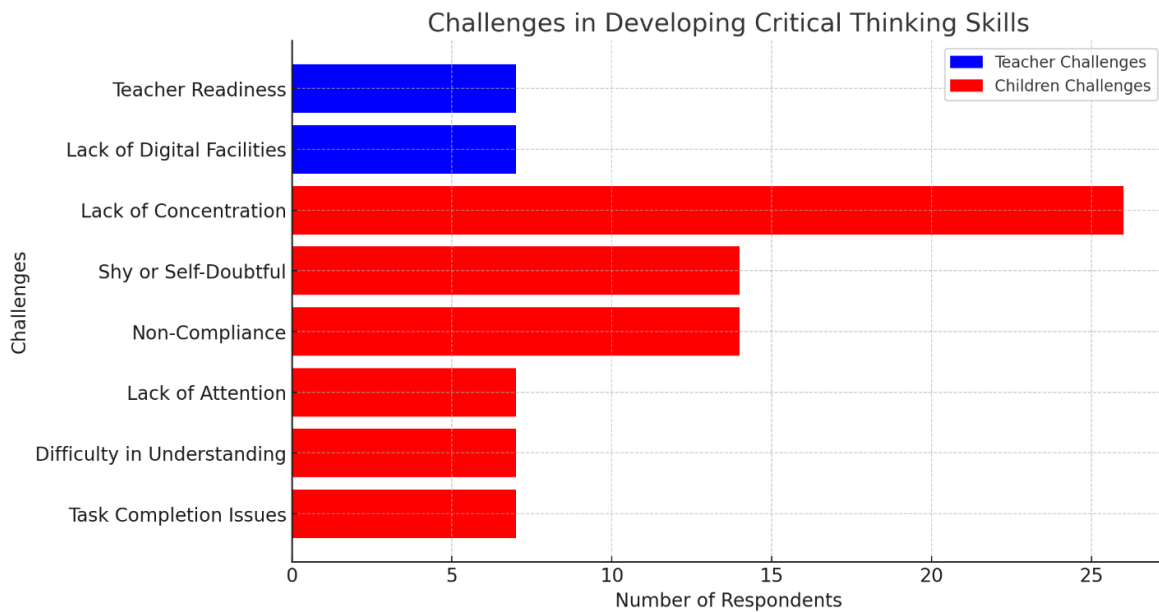
Figure 3. Challenges in Developing Critical Thinking Skills

Based on the data displayed in the "Challenges in Developing Critical Thinking Skills" graph, the challenges in developing critical thinking skills in early childhood in Lebak come from two main factors, namely challenges from teachers and challenges from children. From the teacher's side, there are two main obstacles, namely teaching readiness and limited digital facilities, each experienced by 7 respondents. Teacher readiness in understanding critical thinking concepts and strategies greatly affects the effectiveness of learning. Teachers who are less prepared tend to have difficulty in applying the right methods to stimulate children's thinking (Oliver, Wehby, & Reschly, 2011). In addition, limited digital facilities are also an obstacle in creating a more interactive and innovative learning experience. Goodman (2002) noted that technology-based learning, such as digital simulations and educational games, can increase children's engagement and help develop analytical and evaluative thinking skills.

On the other hand, the more dominant challenges come from children, especially in terms of lack of concentration, which is the main obstacle and is experienced by 26 respondents. Children's difficulty in concentrating can hinder their ability to achieve higher levels of critical thinking, such as analysis, evaluation, and reflection, as outlined in Bloom's Taxonomy of Educational Objectives (Bloom, 1956). This factor can be caused by age development level, interest in the material, or less conducive learning environment conditions. In addition, as many as 14 respondents identified that shyness or lack of self-confidence in children is an obstacle to the development of critical thinking skills. Children who are hesitant to express opinions or answer questions tend to be more passive, making it difficult for teachers to assess the extent to which their critical thinking skills are developing. Lack of participation hinders teachers' ability to assess their critical thinking skills and limits interactions that can encourage independent thinking. In addition, non-compliance in listening to or paying attention to teachers is also a challenge for 14 respondents, resulting in critical thinking processes such as analysis and reflection not running optimally. There are also seven (7) children who have difficulty understanding instructions, concentrating, and completing tasks, all of which are closely related to the development of critical thinking skills, such as the ability to process information and draw conclusions. Cognitive Load Theory explains that high cognitive load inhibits children's ability to process information, think critically, and solve problems independently (Mayer, 2005).

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Discussion

This discussion explores the interrelationship between teachers' understanding of critical thinking, the strategies they employ, and the challenges they face in fostering critical thinking in early childhood education. The responses from participants reveal varied understandings of critical thinking, which can largely be mapped to the indicators outlined by Peter Facione. The research findings indicate that early childhood education teachers have a foundational understanding of critical thinking in children, albeit with varying levels of depth across Peter Facione's critical thinking indicators. The ability to analyze, recognized by 39.6% of respondents, was identified as a key element of critical thinking. Teachers highlighted children’s capacity to explore cause-and-effect relationships and engage in logical comparisons, such as explaining the relationship between a giraffe’s neck length and its dietary habits. However, the examples provided by respondents tend to focus on surface-level analysis, without delving into more complex skills such as evaluating assumptions or systematically breaking down arguments, as emphasized by Facione. This suggests that while teachers understand analysis as an essential aspect of critical thinking, their knowledge of its broader applications is limited.

The concept of curiosity, noted by 14.4% of respondents, aligns with Facione's emphasis on intellectual inquiry as a driver of critical thinking. Teachers recognized that curiosity fosters questioning and exploration, as evidenced by children asking spontaneous questions or investigating phenomena such as color mixing. Yet, not all examples reflect higher-order critical thinking. For instance, questions like “Why does it eat grass?” indicate basic observational curiosity rather than the deeper reflective thinking required to connect ideas or evaluate evidence. Similarly, the ability to form judgments, cited by 12.6% of respondents, shows some alignment with Facione's indicator of evaluation. Responses, such as recounting past events or categorizing animals, demonstrate early steps in judgment formation but often lack the depth of logical assessment or evidence-based decision-making inherent in critical thinking.

Problem-solving and decision-making were also identified by 8.2% and 5.4% of respondents, respectively, as critical thinking skills. Teachers recognized instances where children propose ideas or choose activities, indicating an understanding of these indicators. However, responses often focus on simple choices or actions, such as selecting a game to play, rather than the more systematic problem-solving or rational evaluation Facione describes. Rationality, linked by 4.5% of respondents, similarly reflects an emerging understanding of logical reasoning, yet examples provided lack evidence of structured thought processes or the application of logical criteria in decision-making.

Overall, the responses reveal that while teachers have an emerging understanding of critical thinking indicators as defined by Facione, their interpretations often remain at a basic level. This underscores a need for further development in recognizing and fostering the more nuanced aspects of critical thinking in early childhood education, such as evaluation, systematic problem-solving, and reflective decision-making. The survey results on strategies for developing critical thinking skills in early childhood reveal various approaches employed by teachers. The most common methods are the interactive approach, particularly question-answering and assignments. These strategies effectively engage children in thinking by aligning questions with the material and providing stimulating activities such as images. According to respondents, these methods foster critical thinking by encouraging children to reflect on the material, analyze, and express their thoughts. This approach emphasizes the importance of higher-order thinking skills (HOTS), where children are prompted to think deeply and solve problems.

Additionally, the use of media and teacher guidance stands out as a significant strategy. Many teachers incorporate learning tools such as blocks, Lego, puzzles, and natural materials like rocks and shells to stimulate children’s thinking. Visual media, such as images and videos, further support children's understanding. The active role of teachers in

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explaining and clarifying concepts also plays a crucial part in guiding children's cognitive development. These practices align with Vygotsky's theory of the ZPD, which emphasizes the importance of teacher support in helping children reach higher levels of understanding and independent thinking.

Another strategy involves encouraging active thinking by giving children the freedom to ask questions and express their thoughts. Respondents mention creating opportunities for children to question and explore, helping them build a more constructive learning environment. This aligns with constructivist theories by Bruner and Vygotsky, which highlight the importance of exploration and self-expression in cognitive development. However, some strategies, such as giving children more freedom to select activities or solve problems independently, were less frequently used. Despite being less common, these approaches hold significant potential in developing children's independence, creativity, and decision-making skills. Self-regulated learning theory suggests that offering children more freedom can enhance their ability to make choices, thereby fostering critical thinking skills.

Lastly, there is a tendency for teachers to take the lead in the learning process by offering direct guidance, examples, and explanations. While this approach ensures clarity and understanding, it may limit opportunities for children to independently explore and develop critical thinking skills. However, an approach that is too teacher-centered and restricts children's freedom of thought can hinder children from exploring their ideas independently (Dewey, 2022; Vygotsky, 1978). Therefore, a balance between teacher guidance and allowing children the freedom to explore and express their ideas is essential for fostering critical thinking.

Teachers' unpreparedness in teaching critical thinking to children is a major challenge in the learning process. Paul & Elder (2019) emphasized that teacher readiness plays an important role in building students' critical thinking skills. Conversely, unpreparedness can have an impact on low teacher self-efficacy, which makes them less confident in managing classes and implementing learning strategies that stimulate children's critical thinking skills. Lack of training is one of the main factors in teacher unpreparedness. Celik (2021) found that many teachers were not yet effective in encouraging students to use critical thinking in the classroom. This indicates the need for ongoing training so that teachers can develop skills such as open thinking, asking high-level questions, and assessing the accuracy and reliability of information. Ventista & Brown (2023) stated that consistent and ongoing training has the greatest impact on improving teacher skills and student learning outcomes.

Training and support programs ensure that educators are ready to implement various teaching strategies. However, developing countries such as Indonesia face problems in their implementation. This also occurs in Nigeria which faces challenges related to access, quality assurance, and teacher training, which impacts the implementation of adaptive teaching strategies (Adewusi, Hamad, Adeleke, Nwankwo, & Nwokocha, 2023). In Selangor, Malaysia, lack of training for preschool teachers resulted in the early childhood curriculum being unsuccessfully implemented in Selangor preschools (Sharim, Che Ani, Nik Roseli, Mohd Ghazali, & Lim, 2023).

In addition, limited educational facilities are also a challenge in implementing learning strategies that stimulate children's critical thinking. In several developing countries such as Kosovo and Tanzania, limited educational resources and infrastructure hinder the implementation of learning strategies that support critical thinking (Ilomo, Mlavi, & Ed, 2018). Pianta et al., (2003) added that a suboptimal physical and social environment can affect the behavior of teachers and children in the learning process. Studies in various regions with similar socio-economic conditions show that inadequate infrastructure and limited professional development programs hinder teachers from optimizing children's critical thinking potential. For example, research in Sub-Saharan Africa shows that underfunded education systems fail to provide teachers with the necessary resources, limiting their ability to engage students in higher-order thinking (Adewusi, Al Hamad, Adeleke, Nwankwo, &

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Nwokocha, 2023). This was also seen in West Pokot County, Kenya, where the majority of public ECDE centers were found to lack adequate classrooms, desks, water, kitchen stores, etc. Lack of adequate learning facilities negatively impacts the provision of quality education (Chepkonga, 2017).

This condition is further exacerbated by the lack of concentration of children in the critical thinking process. Diamond (2013) in Executive Function Theory explains that early childhood has limitations in maintaining attention for long periods, which can hinder the critical thinking process that requires focus in analyzing, interpreting, and evaluating information. If learning strategies are not interesting or less varied, children will find it difficult to be actively involved in learning (Pianta et al., 2003).

The long-term implications of low critical thinking skills in early childhood education can affect cognitive flexibility, problem-solving abilities, and future academic achievement. Children who do not develop strong critical thinking skills early on may have difficulty in independent learning, decision-making, and adaptation to complex situations later in life. In addition, deficiencies in critical thinking can affect their ability to sort information in the digital age, making them more vulnerable to misinformation and limiting their analytical skills.

To address these issues, a multifaceted approach is needed that includes more equitable policies, targeted interventions, and ongoing commitment from policymakers and stakeholders. Some practical solutions include increasing access to quality professional development for teachers, integrating critical thinking into early childhood curricula, and providing more diverse and engaging learning materials. Training is needed to improve skills such as open-mindedness, asking high-level questions, and evaluating the accuracy and reliability of information (Celik, 2021). Continuous training and collaborative professional development have a significant impact on improving teacher skills and student learning outcomes (Ventista & Brown, 2023). Mentoring programs, where experienced educators mentor new teachers, can increase teaching confidence and effectiveness (Darling-Hammond, Hyler, & Gardner, 2017). In addition, collaboration between schools, communities, and policymakers is essential to addressing infrastructure gaps and ensuring that all children have equal opportunities to develop critical thinking skills (OECD, 2012).

Conclusion

Based on the research findings, it can be concluded that early childhood educators in Lebak, Banten, generally have a basic understanding of critical thinking, but they are not fully familiar with its indicators, which affects the quality of its integration into teaching practices. Teachers employ various strategies, including interactive question-answer sessions and the use of media, to foster critical thinking in children. However, the lack of a comprehensive understanding of critical thinking indicators limits their effectiveness. Key challenges faced by teachers include insufficient preparedness and the difficulty in maintaining children's attention, which hinders deep thinking processes. To improve these strategies, it is essential to provide targeted training, better access to technology, and more opportunities for collaboration among educators. Moreover, integrating critical thinking into the curriculum will support a more systematic development of these skills. To achieve these goals, local governments and stakeholders must take an active role in transforming early childhood education in the region.

This research contributes to improving the quality of early childhood education, particularly in underprivileged areas, by highlighting the gaps in teachers' understanding of critical thinking and the need for systematic training. By addressing these gaps, educational institutions can enhance teaching effectiveness, ensuring that children develop essential cognitive skills from an early age. Furthermore, this study emphasizes the importance of tailored interventions that align with the local educational context, thereby fostering more equitable access to quality early childhood education.

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Despite its contributions, this study has several limitations. Firstly, it primarily relies on self-reported data from teachers, which may introduce biases in assessing their understanding and implementation of critical thinking strategies. Secondly, the study is cross-sectional, providing only a snapshot of current practices without capturing long-term changes or improvements in teaching effectiveness. Thirdly, external factors such as socioeconomic conditions and school infrastructure, which may also influence the development of critical thinking in children, were not extensively examined.

Future research should consider conducting longitudinal studies to assess the long-term impact of critical thinking training programs on early childhood educators. Additionally, experimental studies comparing different intervention methods could provide deeper insights into the most effective strategies for fostering critical thinking in young learners. Finally, further exploration of the role of parental involvement and community support in enhancing children's critical thinking skills would be beneficial for a more holistic approach to early childhood education development.

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